

Aerosol optical depth retrieval over eastern China using the data of the Directional Polarimetric Camera

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The Directional Polarimetric Camera (DPC) onboard the satellite GaoFen-5 was successfully launched on 9th May, 2018. DPC is the first multi-angle polarized Polarimetric Satellite Sensor of China with 9 observation angles along the track and the spatial resolution of 3.3km. It has the ability to monitoring global atmospheric aerosol temporal and spatial variation. Aerosol optical depth (AOD) over the east of China was retrieved using the polarized observation data of DPC. AOD retrieval based on look-up table (LUT) method was applied in this study. Firstly, the LUT of aerosol optical properties was construct using the eastern Asia aerosol models by radiative transfer mode RT3. Secondly, the surface contribution was estimated using Maignan model (2009). Thirdly, Interpolated AOD of valid view angles was obtained by comparing the observed multi-angle polarized radiance and the LUT for different aerosol models. Lastly, the aerosol mode with least standard variance of AOD is the optimal model and the corresponding mean AOD is the retrieval result. The AOD over eastern China obtained from DPC is basically consistent with the aerosol product of Moderate Resolution Imaging Spectroradiometer (MODIS) in space distribution. The comparison between the AOD retrieved from the DPC and the AOD from Aerosol Robotic Network (AERONET) sites over eastern China shows good correlation.

References

- [1] Li, Z., W. Hou, J. Hong, *et al.*, 2018: Directional Polarimetric Camera (DPC): monitoring aerosol spectral optical properties over land from satellite observation. *J. Quant. Spectrosc. Radiat. Transfer* **218**, 21–37.
- [2] Dubovik, O., Zh. Li, M. I. Mishchenko, *et al.*, 2019: Polarimetric remote sensing of atmospheric aerosols: Instruments, methodologies, results, and perspectives. *J. Quant. Spectrosc. Radiat. Transfer* **224**, 474–511.
- [3] Lee, K. H., and Y. J. Kim, 2010: Satellite remote sensing of Asian aerosols: a case study of clean, polluted and dust storm days. *Atmos. Meas. Tech.* **3**, 2651–2680.

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